



## SEQUENCE LISTING

<110> Guarente, Leonard  
Imai, Shin-ichiro  
Armstrong, Christopher

<120> METHODS FOR IDENTIFYING AGENTS WHICH ALTER HISTINE  
PROTEIN ACETYLATION, DECREASE AGING, INCREASE LIFESPAN

<130> 13407-016001

<140> 09/461,580

<141> 1999-12-15

<160> 38

<170> FastSEQ for Windows Version 4.0

<210> 1

<211> 737

<212> PRT

<213> Mus musculus

<400> 1

F2

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			20					25					30		
Arg	Lys	Arg	Pro	Arg	Arg	Asp	Gly	Pro	Gly	Leu	Gly	Arg	Ser	Pro	Gly
		35				40						45			
Glu	Pro	Ser	Ala	Ala	Val	Ala	Pro	Ala	Ala	Ala	Gly	Cys	Glu	Ala	Ala
	50				55						60				
Ser	Ala	Ala	Ala	Pro	Ala	Ala	Leu	Trp	Arg	Glu	Ala	Ala	Gly	Ala	Ala
65				70					75					80	
Ala	Ser	Ala	Glu	Arg	Glu	Ala	Pro	Ala	Thr	Ala	Val	Ala	Gly	Asp	Gly
			85					90					95		
Asp	Asn	Gly	Ser	Gly	Leu	Arg	Arg	Glu	Pro	Arg	Ala	Ala	Asp	Asp	Phe
		100						105					110		
Asp	Asp	Asp	Glu	Gly	Glu	Glu	Glu	Asp	Glu	Ala	Ala	Ala	Ala	Ala	Ala
		115					120						125		
Ala	Ala	Ala	Ile	Gly	Tyr	Arg	Asp	Asn	Leu	Leu	Leu	Thr	Asp	Gly	Leu
	130					135						140			
Leu	Thr	Asn	Gly	Phe	His	Ser	Cys	Glu	Ser	Asp	Asp	Asp	Asp	Arg	Thr
145				150						155				160	
Ser	His	Ala	Ser	Ser	Ser	Asp	Trp	Thr	Pro	Arg	Pro	Arg	Ile	Gly	Pro
			165						170				175		
Tyr	Thr	Phe	Val	Gln	Gln	His	Leu	Met	Ile	Gly	Thr	Asp	Pro	Arg	Thr
		180						185					190		
Ile	Leu	Lys	Asp	Leu	Leu	Pro	Glu	Thr	Ile	Pro	Pro	Pro	Glu	Leu	Asp
	195					200						205			
Asp	Met	Thr	Leu	Trp	Gln	Ile	Val	Ile	Asn	Ile	Leu	Ser	Glu	Pro	Pro
	210				215						220				
Lys	Arg	Lys	Lys	Arg	Lys	Asp	Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys
225				230					235					240	
Leu	Leu	Gln	Glu	Cys	Lys	Lys	Ile	Ile	Val	Leu	Thr	Gly	Ala	Gly	Val
			245					250						255	

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NOV 07 2002

TECH CENTER 1600/2900

Ser	Val	Ser	Cys	Gly	Ile	Pro	Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr
			260					265					270		
Ala	Arg	Leu	Ala	Val	Asp	Phe	Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met
		275					280					285			
Phe	Asp	Ile	Glu	Tyr	Phe	Arg	Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe
	290					295					300				
Ala	Lys	Glu	Ile	Tyr	Pro	Gly	Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys
305					310					315					320
Phe	Ile	Ala	Leu	Ser	Asp	Lys	Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr
				325					330					335	
Gln	Asn	Ile	Asp	Thr	Leu	Glu	Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu
			340					345					350		
Gln	Cys	His	Gly	Ser	Phe	Ala	Thr	Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr
		355					360					365			
Lys	Val	Asp	Cys	Glu	Ala	Val	Arg	Gly	Asp	Ile	Phe	Asn	Gln	Val	Val
	370					375					380				
Pro	Arg	Cys	Pro	Arg	Cys	Pro	Ala	Asp	Glu	Pro	Leu	Ala	Ile	Met	Lys
385					390						395				400
Pro	Glu	Ile	Val	Phe	Phe	Gly	Glu	Asn	Leu	Pro	Glu	Gln	Phe	His	Arg
				405					410					415	
Ala	Met	Lys	Tyr	Asp	Lys	Asp	Glu	Val	Asp	Leu	Leu	Ile	Val	Ile	Gly
			420					425					430		
Ser	Ser	Leu	Lys	Val	Arg	Pro	Val	Ala	Leu	Ile	Pro	Ser	Ser	Ile	Pro
		435					440					445			
His	Glu	Val	Pro	Gln	Ile	Leu	Ile	Asn	Arg	Glu	Pro	Leu	Pro	His	Leu
	450					455					460				
His	Phe	Asp	Val	Glu	Leu	Leu	Gly	Asp	Cys	Asp	Val	Ile	Ile	Asn	Glu
465					470					475					480
Leu	Cys	His	Arg	Leu	Gly	Gly	Glu	Tyr	Ala	Lys	Leu	Cys	Cys	Asn	Pro
			485						490					495	
Val	Lys	Leu	Ser	Glu	Ile	Thr	Glu	Lys	Pro	Pro	Arg	Pro	Gln	Lys	Glu
		500						505					510		
Leu	Val	His	Leu	Ser	Glu	Leu	Pro	Pro	Thr	Pro	Leu	His	Ile	Ser	Glu
		515					520					525			
Asp	Ser	Ser	Ser	Pro	Glu	Arg	Thr	Val	Pro	Gln	Asp	Ser	Ser	Val	Ile
	530					535					540				
Ala	Thr	Leu	Val	Asp	Gln	Ala	Thr	Asn	Asn	Asn	Val	Asn	Asp	Leu	Glu
545					550					555					560
Val	Ser	Glu	Ser	Ser	Cys	Val	Glu	Glu	Lys	Pro	Gln	Glu	Val	Gln	Thr
				565					570					575	
Ser	Arg	Asn	Val	Glu	Asn	Ile	Asn	Val	Glu	Asn	Pro	Asp	Phe	Lys	Ala
		580						585					590		
Val	Gly	Ser	Ser	Thr	Ala	Asp	Lys	Asn	Glu	Arg	Thr	Ser	Val	Ala	Glu
		595					600					605			
Thr	Val	Arg	Lys	Cys	Trp	Pro	Asn	Arg	Leu	Ala	Lys	Glu	Gln	Ile	Ser
	610					615					620				
Lys	Arg	Leu	Glu	Gly	Asn	Gln	Tyr	Leu	Phe	Val	Pro	Pro	Asn	Arg	Tyr
625					630					635					640
Ile	Phe	His	Gly	Ala	Glu	Val	Tyr	Ser	Asp	Ser	Glu	Asp	Asp	Val	Leu
			645						650					655	
Ser	Ser	Ser	Ser	Cys	Gly	Ser	Asn	Ser	Asp	Ser	Gly	Thr	Cys	Gln	Ser
		660						665					670		
Pro	Ser	Leu	Glu	Glu	Pro	Leu	Glu	Asp	Glu	Ser	Glu	Ile	Glu	Glu	Phe
		675					680					685			
Tyr	Asn	Gly	Leu	Glu	Asp	Asp	Thr	Glu	Arg	Pro	Glu	Cys	Ala	Gly	Gly
	690					695					700				
Ser	Gly	Phe	Gly	Ala	Asp	Gly	Gly	Asp	Gln	Glu	Val	Val	Asn	Glu	Ala

705                      710                      715                      720  
 Ile Ala Thr Arg Gln Glu Leu Thr Asp Val Asn Tyr Pro Ser Asp Lys  
                              725                      730                      735  
 Ser

<210> 2  
 <211> 272  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

<400> 2  
 Ile Asn Lys Val Leu Cys Thr Arg Leu Arg Leu Ser Asn Phe Phe Thr  
 1                      5                      10                      15  
 Ile Asp His Phe Ile Gln Lys Leu His Thr Ala Arg Lys Ile Leu Val  
                              20                      25                      30  
 Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp Phe Arg  
                              35                      40                      45  
 Ser Ser Glu Gly Phe Tyr Ser Lys Ile Lys His Leu Gly Leu Asp Asp  
                              50                      55                      60  
 Pro Gln Asp Val Phe Asn Tyr Asn Ile Phe Met His Asp Pro Ser Val  
 65                      70                      75                      80  
 Phe Tyr Asn Ile Ala Asn Met Val Leu Pro Pro Glu Lys Ile Tyr Ser  
                              85                      90                      95  
 Pro Leu His Ser Phe Ile Lys Met Leu Gln Met Lys Gly Lys Leu Leu  
                              100                      105                      110  
 Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr Ala Gly Ile  
                              115                      120                      125  
 Ser Thr Asp Lys Leu Val Gln Cys His Gly Ser Phe Ala Thr Ala Thr  
                              130                      135                      140  
 Cys Val Thr Cys His Trp Asn Leu Pro Gly Glu Arg Ile Phe Asn Lys  
 145                      150                      155                      160  
 Ile Arg Asn Leu Glu Leu Pro Leu Cys Pro Tyr Cys Tyr Lys Lys Arg  
                              165                      170                      175  
 Arg Glu Tyr Phe Pro Glu Gly Tyr Asn Asn Lys Val Gly Val Ala Ala  
                              180                      185                      190  
 Ser Gln Gly Ser Met Ser Glu Arg Pro Pro Tyr Ile Leu Asn Ser Tyr  
                              195                      200                      205  
 Gly Val Leu Lys Pro Asp Ile Thr Phe Phe Gly Glu Ala Leu Pro Asn  
                              210                      215                      220  
 Lys Phe His Lys Ser Ile Arg Glu Asp Ile Leu Glu Cys Asp Leu Leu  
 225                      230                      235                      240  
 Ile Cys Ile Gly Thr Ser Leu Lys Val Ala Pro Val Ser Glu Ile Val  
                              245                      250                      255  
 Asn Met Val Pro Ser His Val Pro Gln Val Leu Ile Asn Arg Asp Pro  
                              260                      265                      270

<210> 3  
 <211> 267  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

<400> 3  
 Ile Asn Lys Val Leu Ser Thr Arg Leu Arg Leu Pro Asn Phe Asn Thr  
 1                      5                      10                      15  
 Ile Asp His Phe Thr Ala Thr Leu Arg Asn Ala Lys Lys Ile Leu Val  
                              20                      25                      30

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<210> 4
<211> 245
<212> PRT
<213> Mus musculus
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<400> 4															
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Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys	Leu	Leu	Gln	Glu	Cys	Lys	Lys
			20					25					30		
Ile	Ile	Val	Leu	Thr	Gly	Ala	Gly	Val	Ser	Val	Ser	Cys	Gly	Ile	Pro
		35					40					45			
Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr	Ala	Arg	Leu	Ala	Val	Asp	Phe
	50					55					60				
Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met	Phe	Asp	Ile	Glu	Tyr	Phe	Arg
65				70						75				80	
Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe	Ala	Lys	Glu	Ile	Tyr	Pro	Gly
				85					90					95	
Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys	Phe	Ile	Ala	Leu	Ser	Asp	Lys
			100					105					110		
Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Thr	Leu	Glu
		115					120					125			
Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu	Gln	Cys	His	Gly	Ser	Phe	Ala
		130				135					140				
Thr	Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr	Lys	Val	Asp	Cys	Glu	Ala	Val
145				150						155					160

Arg	Gly	Asp	Ile	Phe	Asn	Gln	Val	Val	Pro	Arg	Cys	Pro	Arg	Cys	Pro
				165					170					175	
Ala	Asp	Glu	Pro	Leu	Ala	Ile	Met	Lys	Pro	Glu	Ile	Val	Phe	Phe	Gly
			180					185					190		
Glu	Asn	Leu	Pro	Glu	Gln	Phe	His	Arg	Ala	Met	Lys	Tyr	Asp	Lys	Asp
		195				200						205			
Glu	Val	Asp	Leu	Leu	Ile	Val	Ile	Gly	Ser	Ser	Leu	Lys	Val	Arg	Pro
	210				215						220				
Val	Ala	Leu	Ile	Pro	Ser	Ser	Ile	Pro	His	Glu	Val	Pro	Gln	Ile	Leu
225					230					235					240
Ile	Asn	Arg	Glu	Pro											
				245											

&lt;210&gt; 5

&lt;211&gt; 237

&lt;212&gt; PRT

&lt;213&gt; Salmonella typhimurium

&lt;400&gt; 5

Met	Met	Glu	Asn	Pro	Arg	Val	Leu	Val	Leu	Thr	Gly	Ala	Gly	Ile	Ser
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Ala	Glu	Ser	Gly	Ile	Arg	Thr	Phe	Arg	Ala	Ala	Asp	Gly	Leu	Trp	Glu
			20					25				30			
Glu	His	Arg	Val	Glu	Asp	Val	Ala	Thr	Pro	Glu	Gly	Phe	Ala	Arg	Asn
	35					40						45			
Pro	Gly	Leu	Val	Gln	Thr	Phe	Tyr	Asn	Ala	Arg	Arg	Gln	Gln	Leu	Gln
	50					55					60				
Gln	Pro	Glu	Ile	Gln	Pro	Asn	Ala	Ala	His	Leu	Ala	Leu	Ala	Asn	Leu
65				70					75					80	
Lys	Lys	Arg	Leu	Ala	Ile	Ala	Phe	Leu	Leu	Val	Thr	Gln	Asn	Ile	Asp
			85					90					95		
Asn	Leu	His	Glu	Arg	Ala	Gly	Asn	Arg	Asn	Ile	Ile	Gln	Met	His	Gly
		100					105					110			
Glu	Leu	Leu	Lys	Val	Arg	Cys	Ser	Gln	Ser	Gly	Gln	Ile	Leu	Glu	Trp
	115					120					125				
Asn	Gly	Asp	Val	Met	Pro	Glu	Asp	Lys	Cys	His	Cys	Cys	Gln	Phe	Pro
	130					135					140				
Ala	Pro	Leu	Arg	Pro	His	Val	Val	Trp	Phe	Gly	Glu	Met	Pro	Leu	Gly
145				150					155					160	
Met	Asp	Glu	Ile	Tyr	Met	Ala	Leu	Ser	Met	Ala	Asp	Ile	Phe	Ile	Ala
			165					170					175		
Ile	Gly	Thr	Ser	Gly	His	Val	Tyr	Pro	Ala	Ala	Gly	Phe	Val	His	Glu
	180						185					190			
Ala	Lys	Leu	His	Gly	Ala	His	Thr	Val	Glu	Leu	Asn	Leu	Glu	Pro	Ser
	195					200					205				
Gln	Val	Gly	Asn	Glu	Phe	Glu	Glu	Lys	His	Tyr	Gly	Pro	Ala	Ser	Gln
	210				215						220				
Val	Val	Pro	Glu	Phe	Val	Asp	Lys	Phe	Leu	Lys	Gly	Leu			
225					230					235					

&lt;210&gt; 6

&lt;211&gt; 21

&lt;212&gt; PRT

&lt;213&gt; Homo sapiens

&lt;400&gt; 6

Ala	Arg	Thr	Lys	Gln	Thr	Ala	Arg	Lys	Ser	Thr	Gly	Gly	Lys	Ala	Pro
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----

1 5  
Arg Lys Gln Leu Cys  
20

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<210> 7
<211> 20
<212> PRT
<213> Homo sapiens
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```
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 1          5          10          15
Arg His Arg Cys
      20
```

```
<210> 8
<211> 19
<212> PRT
<213> Homo sapiens
```

```
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Ala Gly Gly Lys Gly Gly Lys Gly Met Gly Lys Val Gly Ala Lys Arg
  1                      5                      10                      15
His Ser Cys
```

```
<210> 9
<211> 128
<212> PRT
<213> Mus musculus
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<400> 9															
Ile	Val	Leu	Thr	Gly	Ala	Gly	Val	Ser	Val	Ser	Cys	Gly	Ile	Pro	Asp
1				5					10					15	
Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr	Ala	Arg	Leu	Ala	Val	Asp	Phe	Pro
			20					25					30		
Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met	Phe	Asp	Ile	Glu	Tyr	Phe	Arg	Lys
		35					40					45			
Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe	Ala	Lys	Glu	Ile	Tyr	Pro	Gly	Gln
		50				55					60				
Phe	Gln	Pro	Ser	Leu	Cys	His	Lys	Phe	Ile	Ala	Leu	Ser	Asp	Lys	Glu
65					70					75				80	
Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Thr	Leu	Glu	Gln
				85					90					95	
Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu	Gln	Cys	His	Gly	Ser	Phe	Ala	Thr
			100					105					110		
Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr	Lys	Val	Asp	Cys	Glu	Ala	Val	Arg
		115					120					125			

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<210> 10
<211> 128
<212> PRT
<213> Saccharomyces cerevisiae
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<400> 10
Leu Val Leu Thr Gly Ala Gly Val Ser Thr Ser Leu Gly Ile Pro Asp
  1             5             10             15
```

Phe	Arg	Ser	Ser	Glu	Gly	Phe	Tyr	Ser	Lys	Ile	Lys	His	Leu	Gly	Leu
			20					25					30		
Asp	Asp	Pro	Gln	Asp	Val	Phe	Asn	Tyr	Asn	Ile	Phe	Met	His	Asp	Pro
		35					40					45			
Ser	Val	Phe	Tyr	Asn	Ile	Ala	Asn	Met	Val	Leu	Pro	Pro	Glu	Lys	Ile
	50					55					60				
Tyr	Ser	Pro	Leu	His	Ser	Phe	Ile	Lys	Met	Leu	Gln	Met	Lys	Gly	Lys
65					70					75					80
Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Asn	Leu	Glu	Ser	Tyr	Ala
				85					90					95	
Gly	Ile	Ser	Thr	Asp	Lys	Leu	Val	Gln	Cys	His	Gly	Ser	Phe	Ala	Thr
			100					105					110		
Ala	Thr	Cys	Val	Thr	Cys	His	Trp	Asn	Leu	Pro	Gly	Glu	Arg	Ile	Phe
		115						120				125			

&lt;210&gt; 11

&lt;211&gt; 336

&lt;212&gt; PRT

<213> *Saccharomyces cerevisiae*

&lt;400&gt; 11

Ala	Ile	Asn	Lys	Val	Leu	Cys	Thr	Arg	Leu	Arg	Leu	Ser	Asn	Phe	Phe
1				5					10					15	
Thr	Ile	Asp	His	Phe	Ile	Gln	Lys	Leu	His	Thr	Ala	Arg	Lys	Ile	Leu
			20					25					30		
Val	Leu	Thr	Gly	Ala	Gly	Val	Ser	Thr	Ser	Leu	Gly	Ile	Pro	Asp	Phe
		35					40					45			
Arg	Ser	Ser	Glu	Gly	Phe	Tyr	Ser	Lys	Ile	Lys	His	Leu	Gly	Leu	Asp
	50					55					60				
Asp	Pro	Gln	Asp	Val	Phe	Asn	Tyr	Asn	Ile	Phe	Met	His	Asp	Pro	Ser
65					70					75					80
Val	Phe	Tyr	Asn	Ile	Ala	Asn	Met	Val	Leu	Pro	Pro	Glu	Lys	Ile	Tyr
				85					90					95	
Ser	Pro	Leu	His	Ser	Phe	Ile	Lys	Met	Leu	Gln	Met	Lys	Gly	Lys	Leu
		100					105						110		
Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Asn	Leu	Glu	Ser	Tyr	Ala	Gly
		115					120					125			
Ile	Ser	Thr	Asp	Lys	Leu	Val	Gln	Cys	His	Gly	Ser	Phe	Ala	Thr	Ala
	130					135					140				
Thr	Cys	Val	Thr	Cys	His	Trp	Asn	Leu	Pro	Gly	Glu	Arg	Ile	Phe	Asn
145					150					155					160
Lys	Ile	Arg	Asn	Leu	Glu	Leu	Pro	Leu	Cys	Pro	Tyr	Cys	Tyr	Lys	Lys
			165						170					175	
Arg	Arg	Glu	Tyr	Phe	Pro	Glu	Gly	Tyr	Asn	Asn	Lys	Val	Gly	Val	Ala
			180					185					190		
Ala	Ser	Gln	Gly	Ser	Met	Ser	Glu	Arg	Pro	Pro	Tyr	Ile	Leu	Asn	Ser
		195					200					205			
Tyr	Gly	Val	Leu	Lys	Pro	Asp	Ile	Thr	Phe	Phe	Gly	Glu	Ala	Leu	Pro
	210					215					220				
Asn	Lys	Phe	His	Lys	Ser	Ile	Arg	Glu	Asp	Ile	Leu	Glu	Cys	Asp	Leu
225					230					235					240
Leu	Ile	Cys	Ile	Gly	Thr	Ser	Leu	Lys	Val	Ala	Pro	Val	Ser	Glu	Ile
				245					250					255	
Val	Asn	Met	Val	Pro	Ser	His	Val	Pro	Gln	Val	Leu	Ile	Asn	Arg	Asp
		260						265					270		
Pro	Val	Lys	His	Ala	Glu	Phe	Asp	Leu	Ser	Leu	Leu	Gly	Tyr	Cys	Asp
		275					280					285			

Asp	Ile	Ala	Ala	Met	Val	Ala	Gln	Lys	Cys	Gly	Trp	Thr	Ile	Pro	His
290						295					300				
Lys	Lys	Trp	Asn	Asp	Leu	Lys	Asn	Lys	Asn	Phe	Lys	Cys	Gln	Glu	Lys
305					310					315					320
Asp	Lys	Gly	Val	Tyr	Val	Val	Thr	Ser	Asp	Glu	His	Pro	Lys	Thr	Leu
				325					330					335	

&lt;210&gt; 12

&lt;211&gt; 327

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 12

Val	Ile	Asn	Ile	Leu	Ser	Glu	Pro	Pro	Lys	Arg	Lys	Lys	Arg	Lys	Asp
1				5					10					15	
Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys	Leu	Leu	Gln	Glu	Cys	Lys	Lys
			20					25					30		
Ile	Ile	Val	Leu	Thr	Gly	Ala	Gly	Val	Ser	Val	Ser	Cys	Gly	Ile	Pro
		35					40					45			
Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr	Ala	Arg	Leu	Ala	Val	Asp	Phe
50						55					60				
Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met	Phe	Asp	Ile	Glu	Tyr	Phe	Arg
65					70				75					80	
Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe	Ala	Lys	Glu	Ile	Tyr	Pro	Gly
				85					90					95	
Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys	Phe	Ile	Ala	Leu	Ser	Asp	Lys
			100					105					110		
Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Thr	Leu	Glu
		115					120					125			
Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu	Gln	Cys	His	Gly	Ser	Phe	Ala
		130				135					140				
Thr	Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr	Lys	Val	Asp	Cys	Glu	Ala	Val
145					150					155				160	
Arg	Gly	Asp	Ile	Phe	Asn	Gln	Val	Val	Pro	Arg	Cys	Pro	Arg	Cys	Pro
				165					170					175	
Ala	Asp	Glu	Pro	Leu	Ala	Ile	Met	Lys	Pro	Glu	Ile	Val	Phe	Phe	Gly
			180					185					190		
Glu	Asn	Leu	Pro	Glu	Gln	Phe	His	Arg	Ala	Met	Lys	Tyr	Asp	Lys	Asp
		195					200					205			
Glu	Val	Asp	Leu	Leu	Ile	Val	Ile	Gly	Ser	Ser	Leu	Lys	Val	Arg	Pro
		210				215					220				
Val	Ala	Leu	Ile	Pro	Ser	Ser	Ile	Pro	His	Glu	Val	Pro	Gln	Ile	Leu
225					230					235				240	
Ile	Asn	Arg	Glu	Pro	Leu	Pro	His	Leu	His	Phe	Asp	Val	Glu	Leu	Leu
				245					250					255	
Gly	Asp	Cys	Asp	Val	Ile	Ile	Asn	Glu	Leu	Cys	His	Arg	Leu	Gly	Gly
			260					265					270		
Glu	Tyr	Ala	Lys	Leu	Cys	Cys	Asn	Pro	Val	Lys	Leu	Ser	Glu	Ile	Thr
		275					280					285			
Glu	Lys	Pro	Pro	Arg	Pro	Gln	Lys	Glu	Leu	Val	His	Leu	Ser	Glu	Leu
		290				295					300				
Pro	Pro	Thr	Pro	Leu	His	Ile	Ser	Glu	Asp	Ser	Ser	Ser	Pro	Glu	Arg
305					310					315					320
Thr	Val	Pro	Gln	Asp	Ser	Ser									
				325											

&lt;210&gt; 13



<211> 237  
 <212> PRT  
 <213> *Salmonella typhimurium*

<400> 13

Met	Met	Glu	Asn	Pro	Arg	Val	Leu	Val	Leu	Thr	Gly	Ala	Gly	Ile	Ser
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Ala	Glu	Ser	Gly	Ile	Arg	Thr	Phe	Arg	Ala	Ala	Asp	Gly	Leu	Trp	Glu
			20					25					30		
Glu	His	Arg	Val	Glu	Asp	Val	Ala	Thr	Pro	Glu	Gly	Pro	Ala	Arg	Asn
		35					40					45			
Pro	Gly	Leu	Val	Gln	Thr	Phe	Tyr	Asn	Ala	Arg	Arg	Gln	Gln	Leu	Gln
	50					55					60				
Gln	Pro	Glu	Ile	Gln	Pro	Asn	Ala	Ala	His	Leu	Ala	Leu	Ala	Asn	Leu
65					70					75				80	
Lys	Lys	Arg	Leu	Ala	Ile	Ala	Phe	Leu	Leu	Val	Thr	Gln	Asn	Ile	Asp
			85					90					95		
Asn	Leu	His	Glu	Arg	Ala	Gly	Asn	Arg	Asn	Ile	Ile	Gln	Met	His	Gly
			100					105					110		
Glu	Leu	Leu	Lys	Val	Arg	Cys	Ser	Gln	Ser	Gly	Gln	Ile	Leu	Glu	Trp
			115				120					125			
Asn	Gly	Asp	Val	Met	Pro	Glu	Asp	Lys	Cys	His	Cys	Cys	Gln	Phe	Pro
	130					135					140				
Ala	Pro	Leu	Arg	Pro	His	Val	Val	Trp	Phe	Gly	Glu	Met	Pro	Leu	Gly
145					150					155				160	
Met	Asp	Glu	Ile	Tyr	Met	Ala	Leu	Ser	Met	Ala	Asp	Ile	Phe	Ile	Ala
			165					170					175		
Ile	Gly	Thr	Ser	Gly	His	Val	Tyr	Pro	Ala	Ala	Gly	Phe	Val	His	Glu
		180					185						190		
Ala	Lys	Leu	His	Gly	Ala	His	Thr	Val	Glu	Leu	Asn	Leu	Glu	Pro	Ser
	195					200						205			
Gln	Val	Gly	Asn	Glu	Phe	Glu	Glu	Lys	His	Tyr	Gly	Pro	Ala	Ser	Gln
	210				215						220				
Val	Val	Pro	Glu	Phe	Val	Asp	Lys	Phe	Leu	Lys	Gly	Leu			
225				230						235					

<210> 14  
 <211> 106  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

<400> 14

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Asp	Phe	Arg	Ser	Ser	Glu	Gly	Phe	Tyr	Ser	Lys	Ile	Lys	His	Leu	Gly
			20					25					30		
Leu	Asp	Asp	Pro	Gln	Asp	Val	Phe	Asn	Tyr	Asn	Ile	Phe	Met	His	Asp
		35					40					45			
Pro	Ser	Val	Phe	Tyr	Asn	Ile	Ala	Asn	Met	Val	Leu	Pro	Pro	Glu	Lys
	50					55					60				
Ile	Tyr	Ser	Pro	Leu	His	Ser	Phe	Ile	Lys	Met	Leu	Gln	Met	Lys	Gly
65					70					75				80	
Lys	Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Asn	Leu	Glu	Ser	Tyr
			85					90					95		
Ala	Gly	Ile	Ser	Thr	Asp	Lys	Leu	Val	Gln						
			100					105							

<210> 15  
 <211> 106  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

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 Asp Phe Arg Ser Ser Glu Gly Phe Tyr Ser Lys Ile Arg His Leu Gly  
 20 25 30  
 Leu Glu Asp Pro Gln Asp Val Phe Asn Leu Asp Ile Phe Leu Gln Asp  
 35 40 45  
 Pro Ser Val Phe Tyr Asn Ile Ala His Met Val Leu Pro Pro Glu Asn  
 50 55 60  
 Met Tyr Ser Pro Leu His Ser Phe Ile Lys Met Leu Gln Asp Lys Gly  
 65 70 75 80  
 Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile Asp Asn Leu Glu Ser Tyr  
 85 90 95  
 Ala Gly Ile Asp Pro Asp Lys Leu Val Gln  
 100 105

<210> 16  
 <211> 107  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

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 Asp Phe Arg Ser Pro Gly Thr Gly Leu Tyr His Asn Leu Ala Arg Leu  
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 Lys Leu Pro Tyr Pro Glu Ala Val Phe Asp Val Asp Phe Phe Gln Ser  
 35 40 45  
 Asp Pro Leu Pro Phe Tyr Thr Leu Ala Lys Glu Leu Tyr Pro Gly Asn  
 50 55 60  
 Phe Arg Pro Ser Lys Phe His Tyr Leu Leu Lys Leu Phe Gln Asp Lys  
 65 70 75 80  
 Asp Val Leu Lys Arg Val Tyr Thr Gln Asn Ile Asp Thr Leu Glu Arg  
 85 90 95  
 Gln Ala Gly Val Lys Asp Asp Leu Ile Ile Glu  
 100 105

<210> 17  
 <211> 131  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

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 20 25 30  
 Ser Gln Tyr Trp Ser Ile Lys Ser Gly Arg Glu Met Phe Asp Ile Ser  
 35 40 45  
 Leu Phe Arg Asp Asp Phe Lys Ile Ser Ile Phe Ala Lys Phe Met Glu  
 50 55 60  
 Arg Leu Tyr Ser Asn Val Gln Leu Ala Lys Pro Thr Lys Thr His Lys

65					70					75					80
Phe	Ile	Ala	His	Leu	Lys	Asp	Arg	Asn	Lys	Leu	Leu	Arg	Cys	Tyr	Thr
				85					90					95	
Gln	Asn	Ile	Asp	Gly	Leu	Glu	Glu	Ser	Ile	Gly	Leu	Thr	Leu	Ser	Asn
			100					105					110		
Arg	Lys	Leu	Pro	Leu	Thr	Ser	Phe	Ser	Ser	His	Trp	Lys	Asn	Leu	Asp
		115					120					125			
Val	Val	Gln													
		130													

<210> 18  
 <211> 117  
 <212> PRT  
 <213> *Saccharomyces cerevisiae*

<400> 18															
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Asp	Phe	Arg	Ser	Ser	Glu	Gly	Ile	Phe	Ser	Thr	Val	Asn	Gly	Gly	Ser
			20					25					30		
Gly	Lys	Asp	Leu	Phe	Asp	Tyr	Asn	Arg	Val	Tyr	Gly	Asp	Glu	Ser	Met
		35					40					45			
Ser	Leu	Lys	Phe	Asn	Gln	Leu	Met	Val	Ser	Leu	Phe	Arg	Leu	Ser	Lys
		50				55					60				
Asn	Cys	Gln	Pro	Thr	Lys	Phe	His	Glu	Met	Leu	Asn	Glu	Phe	Ala	Arg
65					70					75					80
Asp	Gly	Arg	Leu	Leu	Arg	Leu	Tyr	Thr	Gln	Asn	Ile	Asp	Gly	Leu	Asp
				85					90					95	
Thr	Gln	Leu	Pro	His	Leu	Ser	Thr	Asn	Val	Pro	Leu	Ala	Lys	Pro	Ile
			100					105					110		
Pro	Ser	Thr	Val	Gln											
			115												

<210> 19  
 <211> 106  
 <212> PRT  
 <213> *Mus musculus*

<400> 19															
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Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr	Ala	Arg	Leu	Ala	Val	Asp	Phe
			20					25					30		
Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met	Phe	Asp	Ile	Glu	Tyr	Phe	Arg
		35				40						45			
Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe	Ala	Lys	Glu	Ile	Tyr	Pro	Gly
		50				55					60				
Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys	Phe	Ile	Ala	Leu	Ser	Asp	Lys
65					70					75					80
Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr	Gln	Asn	Ile	Asp	Thr	Leu	Glu
			85						90					95	
Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu	Gln						
			100					105							

<210> 20  
 <211> 107  
 <212> PRT

<213> Mus musculus

<400> 20

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          20           25           30
His Leu Pro Tyr Pro Glu Ala Ile Phe Glu Ile Ser Tyr Phe Lys Lys
          35           40           45
His Pro Glu Pro Phe Phe Ala Leu Ala Lys Glu Leu Tyr Pro Gly Gln
          50           55           60
Phe Lys Pro Thr Ile Cys His Tyr Phe Ile Arg Leu Leu Lys Glu Lys
65           70           75           80
Gly Leu Leu Leu Arg Cys Tyr Thr Gln Asn Ile Asp Thr Leu Glu Arg
          85           90           95
Val Ala Gly Leu Glu Pro Gln Asp Leu Val Glu
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<210> 21

<211> 86

<212> PRT

<213> Mus musculus

<400> 21

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Gly Thr Arg Leu Tyr Ser Asn Leu Gln Gln Tyr Asp Ile Pro Tyr Pro
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          20           25           30
Phe Met Leu Ala Lys Glu Leu Tyr Pro Gly His Tyr Arg Pro Asn Val
          35           40           45
Thr His Tyr Phe Leu Arg Leu Leu His Asp Lys Glu Leu Leu Leu Arg
          50           55           60
Leu Tyr Thr Gln Asn Ile Asp Gly Leu Glu Arg Ala Ser Gly Ile Pro
65           70           75           80
Ala Ser Lys Leu Val Glu
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<210> 22

<211> 85

<212> PRT

<213> Unknown

<220>

<223> Unknown Protein

<400> 22

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          20           25           30
Ala Pro Lys Phe Asp Thr Thr Phe Glu Asn Ala Arg Pro Ser Lys Thr
          35           40           45
His Met Ala Leu Val Gln Leu Glu Arg Met Gly Phe Leu Ser Phe Leu
          50           55           60
Val Ser Gln Asn Val Asp Gly Leu Asp Val Arg Ser Gly Phe Pro Arg
65           70           75           80
Asp Lys Leu Ala Glu

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85

<210> 23  
 <211> 71  
 <212> PRT  
 <213> Unknown

<220>  
 <223> Unknown Protein

<400> 23  
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 1 5 10 15  
 Asp Tyr Arg Ser Glu Lys Val Gly Leu Tyr Ala Arg Thr Asp Arg Arg  
 20 25 30  
 Pro Ile Gln His Ile Asp Phe Val Pro Val Leu Arg Ser Ala Ser Gly  
 35 40 45  
 Thr Trp Pro Glu Asn Leu Trp Ala Gly Leu Asn Ser Pro Leu Thr Asn  
 50 55 60  
 Pro Thr Gln His Thr Trp Leu  
 65 70

<210> 24  
 <211> 75  
 <212> PRT  
 <213> Unknown

<220>  
 <223> Unknown Protein

<400> 24  
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 Thr Phe Arg Gly Ala Gly Gly Tyr Trp Arg Lys Trp Gln Ala Gln Asp  
 20 25 30  
 Leu Ala Thr Pro Gln Ala Phe Ala Arg Asn Pro Ser Gln Val Trp Glu  
 35 40 45  
 Phe Tyr His Tyr Arg Arg Glu Val Met Arg Ser Lys Glu Pro Asn Pro  
 50 55 60  
 Gly His Leu Ala Ile Ala Gln Cys Glu Ala Arg  
 65 70 75

<210> 25  
 <211> 3869  
 <212> DNA  
 <213> Mus musculus

<220>  
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<400> 25  
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 Met Ala Asp  
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 gag gtg gcg ctc gcc ctt cag gcc gcc ggc tcc cct tcc gcg gcg gcc 104

Glu	Val	Ala	Leu	Ala	Leu	Gln	Ala	Ala	Gly	Ser	Pro	Ser	Ala	Ala	Ala		
5						10					15						
gcc	atg	gag	gcc	gcg	tcg	cag	ccg	gcg	gac	gag	ccg	ctc	cgc	aag	agg	152	
Ala	Met	Glu	Ala	Ala	Ser	Gln	Pro	Ala	Asp	Glu	Pro	Leu	Arg	Lys	Arg		
20					25					30					35		
ccc	cgc	cga	gac	ggg	cct	ggc	ctc	ggg	cgc	agc	ccg	ggc	gag	ccg	agc	200	
Pro	Arg	Arg	Asp	Gly	Pro	Gly	Leu	Gly	Arg	Ser	Pro	Gly	Glu	Pro	Ser		
				40					45					50			
gca	gca	gtg	gcg	ccg	gcg	gcc	gcg	ggg	tgt	gag	gcg	gcg	agc	gcc	gcg	248	
Ala	Ala	Val	Ala	Pro	Ala	Ala	Ala	Gly	Cys	Glu	Ala	Ala	Ser	Ala	Ala		
			55					60					65				
gcc	ccg	gcg	gcg	ctg	tgg	cgg	gag	gcg	gca	ggg	gcg	gcg	gcg	agc	gcg	296	
Ala	Pro	Ala	Ala	Leu	Trp	Arg	Glu	Ala	Ala	Gly	Ala	Ala	Ala	Ser	Ala		
	70						75					80					
gag	cgg	gag	gcc	ccg	gcg	acg	gcc	gtg	gcc	ggg	gac	gga	gac	aat	ggg	344	
Glu	Arg	Glu	Ala	Pro	Ala	Thr	Ala	Val	Ala	Gly	Asp	Gly	Asp	Asn	Gly		
	85					90					95						
tcc	ggc	ctg	cgg	cgg	gag	ccg	agg	gcg	gct	gac	gac	ttc	gac	gac	gac	392	
Ser	Gly	Leu	Arg	Arg	Glu	Pro	Arg	Ala	Ala	Asp	Asp	Phe	Asp	Asp	Asp		
100					105					110					115		
gag	ggc	gag	gag	gag	gac	gag	gcg	gcg	gcg	gca	gcg	gcg	gcg	gca	gcg	440	
Glu	Gly	Glu	Glu	Glu	Asp	Glu	Ala	Ala	Ala	Ala	Ala	Ala	Ala	Ala	Ala		
				120					125					130			
atc	ggc	tac	cga	gac	aac	ctc	ctg	ttg	acc	gat	gga	ctc	ctc	act	aat	488	
Ile	Gly	Tyr	Arg	Asp	Asn	Leu	Leu	Leu	Thr	Asp	Gly	Leu	Leu	Thr	Asn		
			135					140					145				
ggc	ttt	cat	tcc	tgt	gaa	agt	gat	gac	gat	gac	aga	acg	tca	cac	gcc	536	
Gly	Phe	His	Ser	Cys	Glu	Ser	Asp	Asp	Asp	Asp	Arg	Thr	Ser	His	Ala		
	150						155					160					
agc	tct	agt	gac	tgg	act	ccg	cgg	ccg	cgg	ata	ggg	cca	tat	act	ttt	584	
Ser	Ser	Ser	Asp	Trp	Thr	Pro	Arg	Pro	Arg	Ile	Gly	Pro	Tyr	Thr	Phe		
	165					170					175						
gtt	cag	caa	cat	ctc	atg	att	ggc	acc	gat	cct	cga	aca	att	ctt	aaa	632	
Val	Gln	Gln	His	Leu	Met	Ile	Gly	Thr	Asp	Pro	Arg	Thr	Ile	Leu	Lys		
180					185					190					195		
gat	tta	tta	cca	gaa	aca	att	cct	cca	cct	gag	ctg	gat	gat	atg	acg	680	
Asp	Leu	Leu	Pro	Glu	Thr	Ile	Pro	Pro	Pro	Glu	Leu	Asp	Asp	Met	Thr		
			200						205					210			
ctg	tgg	cag	att	gtt	att	aat	atc	ctt	tca	gaa	cca	cca	aag	cgg	aaa	728	
Leu	Trp	Gln	Ile	Val	Ile	Asn	Ile	Leu	Ser	Glu	Pro	Pro	Lys	Arg	Lys		
			215					220					225				
aaa	aga	aaa	gat	atc	aat	aca	att	gaa	gat	gct	gtg	aag	tta	ctg	cag	776	
Lys	Arg	Lys	Asp	Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys	Leu	Leu	Gln		

230	235	240	
gag tgt aaa aag ata ata gtt ctg act gga gct ggg gtt tct gtc tcc Glu Cys Lys Lys Ile Ile Val Leu Thr Gly Ala Gly Val Ser Val Ser 245 250 255			824
tgt ggg att cct gac ttc aga tca aga gac ggt atc tat gct cgc ctt Cys Gly Ile Pro Asp Phe Arg Ser Arg Asp Gly Ile Tyr Ala Arg Leu 260 265 270 275			872
gcg gtg gac ttc cca gac ctc cca gac cct caa gcc atg ttt gat att Ala Val Asp Phe Pro Asp Leu Pro Asp Pro Gln Ala Met Phe Asp Ile 280 285 290			920
gag tat ttt aga aaa gac cca aga cca ttc ttc aag ttt gca aag gaa Glu Tyr Phe Arg Lys Asp Pro Arg Pro Phe Phe Lys Phe Ala Lys Glu 295 300 305			968
ata tat ccc gga cag ttc cag ccg tct ctg tgt cac aaa ttc ata gct Ile Tyr Pro Gly Gln Phe Gln Pro Ser Leu Cys His Lys Phe Ile Ala 310 315 320			1016
ttg tca gat aag gaa gga aaa cta ctt cga aat tat act caa aat ata Leu Ser Asp Lys Glu Gly Lys Leu Leu Arg Asn Tyr Thr Gln Asn Ile 325 330 335			1064
gat acc ttg gag cag gtt gca gga atc caa agg atc ctt cag tgt cat Asp Thr Leu Glu Gln Val Ala Gly Ile Gln Arg Ile Leu Gln Cys His 340 345 350 355			1112
ggt tcc ttt gca aca gca tct tgc ctg att tgt aaa tac aaa gtt gat Gly Ser Phe Ala Thr Ala Ser Cys Leu Ile Cys Lys Tyr Lys Val Asp 360 365 370			1160
tgt gaa gct gtt cgt gga gac att ttt aat cag gta gtt cct cgg tgc Cys Glu Ala Val Arg Gly Asp Ile Phe Asn Gln Val Val Pro Arg Cys 375 380 385			1208
cct agg tgc cca gct gat gag cca ctt gcc atc atg aag cca gag att Pro Arg Cys Pro Ala Asp Glu Pro Leu Ala Ile Met Lys Pro Glu Ile 390 395 400			1256
gtc ttc ttt ggt gaa aac tta cca gaa cag ttt cat aga gcc atg aag Val Phe Phe Gly Glu Asn Leu Pro Glu Gln Phe His Arg Ala Met Lys 405 410 415			1304
tat gac aaa gat gaa gtt gac ctc ctc att gtt att gga tct tct ctg Tyr Asp Lys Asp Glu Val Asp Leu Leu Ile Val Ile Gly Ser Ser Leu 420 425 430 435			1352
aaa gtg aga cca gta gca cta att cca agt tct ata ccc cat gaa gtg Lys Val Arg Pro Val Ala Leu Ile Pro Ser Ser Ile Pro His Glu Val 440 445 450			1400
cct caa ata tta ata aat agg gaa cct ttg cct cat cta cat ttt gat Pro Gln Ile Leu Ile Asn Arg Glu Pro Leu Pro His Leu His Phe Asp 455 460 465			1448

gta gag ctc ctt gga gac tgc gat gtt ata att aat gag ttg tgt cat	1496
Val Glu Leu Leu Gly Asp Cys Asp Val Ile Ile Asn Glu Leu Cys His	
470 475 480	
agg cta ggt ggt gaa tat gcc aaa ctt tgt tgt aac cct gta aag ctt	1544
Arg Leu Gly Gly Glu Tyr Ala Lys Leu Cys Cys Asn Pro Val Lys Leu	
485 490 495	
tca gaa att act gaa aaa cct cca cgc cca caa aag gaa ttg gtt cat	1592
Ser Glu Ile Thr Glu Lys Pro Pro Arg Pro Gln Lys Glu Leu Val His	
500 505 510 515	
tta tca gag ttg cca cca aca cct ctt cat att tcg gaa gac tca agt	1640
Leu Ser Glu Leu Pro Pro Thr Pro Leu His Ile Ser Glu Asp Ser Ser	
520 525 530	
tca cct gaa aga act gta cca caa gac tct tct gtg att gct aca ctt	1688
Ser Pro Glu Arg Thr Val Pro Gln Asp Ser Ser Val Ile Ala Thr Leu	
535 540 545	
gta gac caa gca aca aac aac aat gtt aat gat tta gaa gta tct gaa	1736
Val Asp Gln Ala Thr Asn Asn Asn Val Asn Asp Leu Glu Val Ser Glu	
550 555 560	
tca agt tgt gtg gaa gaa aaa cca caa gaa gta cag act agt agg aat	1784
Ser Ser Cys Val Glu Glu Lys Pro Gln Glu Val Gln Thr Ser Arg Asn	
565 570 575	
gtt gag aac att aat gtg gaa aat cca gat ttt aag gct gtt ggt tcc	1832
Val Glu Asn Ile Asn Val Glu Asn Pro Asp Phe Lys Ala Val Gly Ser	
580 585 590 595	
agt act gca gac aaa aat gaa aga act tca gtt gca gaa aca gtg aga	1880
Ser Thr Ala Asp Lys Asn Glu Arg Thr Ser Val Ala Glu Thr Val Arg	
600 605 610	
aaa tgc tgg cct aat aga ctt gca aag gag cag att agt aag cgg ctt	1928
Lys Cys Trp Pro Asn Arg Leu Ala Lys Glu Gln Ile Ser Lys Arg Leu	
615 620 625	
gag ggt aat caa tac ctg ttt gta cca cca aat cgt tac ata ttc cac	1976
Glu Gly Asn Gln Tyr Leu Phe Val Pro Pro Asn Arg Tyr Ile Phe His	
630 635 640	
ggg gct gag gta tac tca gac tct gaa gat gac gtc ttg tcc tct agt	2024
Gly Ala Glu Val Tyr Ser Asp Ser Glu Asp Asp Val Leu Ser Ser Ser	
645 650 655	
tcc tgt ggc agt aac agt gac agt ggc aca tgc cag agt cca agt tta	2072
Ser Cys Gly Ser Asn Ser Asp Ser Gly Thr Cys Gln Ser Pro Ser Leu	
660 665 670 675	
gaa gaa ccc ttg gaa gat gaa agt gaa att gaa gaa ttc tac aat ggc	2120
Glu Glu Pro Leu Glu Asp Glu Ser Glu Ile Glu Glu Phe Tyr Asn Gly	
680 685 690	



ttg gaa gat gat acg gag agg ccc gaa tgt gct gga gga tct gga ttt	2168
Leu Glu Asp Asp Thr Glu Arg Pro Glu Cys Ala Gly Gly Ser Gly Phe	
695 700 705	

gga gct gat gga ggg gat caa gag gtt gtt aat gaa gct ata gct aca	2216
Gly Ala Asp Gly Gly Asp Gln Glu Val Val Asn Glu Ala Ile Ala Thr	
710 715 720	

aga cag gaa ttg aca gat gta aac tat cca tca gac aaa tca	2258
Arg Gln Glu Leu Thr Asp Val Asn Tyr Pro Ser Asp Lys Ser	
725 730 735	

taacactatt	gaagctgtcc	ggattcagga	attgctccac	cagcattggg	aacttttagca	2318
tgtcaaaaaa	atgaatgttt	acttgtgaac	ttgaacaagg	aaatctgaaa	gatgtattat	2378
ttatagactg	gaaaatagat	tgtcttcttg	gataatttct	aaagttccat	catttctgtt	2438
tgtacttgta	cattcaacac	tgttggttga	cttcaccttc	ctttcaagg	tcatttgtat	2498
gatacattcg	tatgtatgta	taattttgtt	ttttgcctaa	tgagtttcaa	ccttttaaag	2558
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gggagagtgt	aatatttttg	actgctgttt	ttccattaat	gaggaaagca	ataggcctct	3158
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ggcatatggt	ttgtagaccg	tttaatgact	ggattatctt	cctccaactt	ttgaaataca	3818
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&lt;210&gt; 26

&lt;211&gt; 737

&lt;212&gt; PRT

&lt;213&gt; Mus musculus

&lt;400&gt; 26

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			20					25					30		
Arg	Lys	Arg	Pro	Arg	Arg	Asp	Gly	Pro	Gly	Leu	Gly	Arg	Ser	Pro	Gly
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Ala	Ser	Ala	Glu	Arg	Glu	Ala	Pro	Ala	Thr	Ala	Val	Ala	Gly	Asp	Gly

				85					90					95			
Asp	Asn	Gly	Ser	Gly	Leu	Arg	Arg	Glu	Pro	Arg	Ala	Ala	Asp	Asp	Phe		
			100					105					110				
Asp	Asp	Asp	Glu	Gly	Glu	Glu	Glu	Asp	Glu	Ala	Ala	Ala	Ala	Ala	Ala	Ala	
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Ala	Ala	Ala	Ile	Gly	Tyr	Arg	Asp	Asn	Leu	Leu	Leu	Thr	Asp	Gly	Leu		
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Leu	Thr	Asn	Gly	Phe	His	Ser	Cys	Glu	Ser	Asp	Asp	Asp	Asp	Arg	Thr		
145				150						155					160		
Ser	His	Ala	Ser	Ser	Ser	Asp	Trp	Thr	Pro	Arg	Pro	Arg	Ile	Gly	Pro		
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Tyr	Thr	Phe	Val	Gln	Gln	His	Leu	Met	Ile	Gly	Thr	Asp	Pro	Arg	Thr		
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Asp	Met	Thr	Leu	Trp	Gln	Ile	Val	Ile	Asn	Ile	Leu	Ser	Glu	Pro	Pro		
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Lys	Arg	Lys	Lys	Arg	Lys	Asp	Ile	Asn	Thr	Ile	Glu	Asp	Ala	Val	Lys		
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Leu	Leu	Gln	Glu	Cys	Lys	Lys	Ile	Ile	Val	Leu	Thr	Gly	Ala	Gly	Val		
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Ser	Val	Ser	Cys	Gly	Ile	Pro	Asp	Phe	Arg	Ser	Arg	Asp	Gly	Ile	Tyr		
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Ala	Arg	Leu	Ala	Val	Asp	Phe	Pro	Asp	Leu	Pro	Asp	Pro	Gln	Ala	Met		
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Phe	Asp	Ile	Glu	Tyr	Phe	Arg	Lys	Asp	Pro	Arg	Pro	Phe	Phe	Lys	Phe		
		290				295					300						
Ala	Lys	Glu	Ile	Tyr	Pro	Gly	Gln	Phe	Gln	Pro	Ser	Leu	Cys	His	Lys		
305				310					315						320		
Phe	Ile	Ala	Leu	Ser	Asp	Lys	Glu	Gly	Lys	Leu	Leu	Arg	Asn	Tyr	Thr		
			325					330						335			
Gln	Asn	Ile	Asp	Thr	Leu	Glu	Gln	Val	Ala	Gly	Ile	Gln	Arg	Ile	Leu		
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Gln	Cys	His	Gly	Ser	Phe	Ala	Thr	Ala	Ser	Cys	Leu	Ile	Cys	Lys	Tyr		
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Lys	Val	Asp	Cys	Glu	Ala	Val	Arg	Gly	Asp	Ile	Phe	Asn	Gln	Val	Val		
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Pro	Glu	Ile	Val	Phe	Phe	Gly	Glu	Asn	Leu	Pro	Glu	Gln	Phe	His	Arg		
			405					410					415				
Ala	Met	Lys	Tyr	Asp	Lys	Asp	Glu	Val	Asp	Leu	Leu	Ile	Val	Ile	Gly		
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Ser	Ser	Leu	Lys	Val	Arg	Pro	Val	Ala	Leu	Ile	Pro	Ser	Ser	Ile	Pro		
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His	Glu	Val	Pro	Gln	Ile	Leu	Ile	Asn	Arg	Glu	Pro	Leu	Pro	His	Leu		
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His	Phe	Asp	Val	Glu	Leu	Leu	Gly	Asp	Cys	Asp	Val	Ile	Ile	Asn	Glu		
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			485					490						495			
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Leu	Val	His	Leu	Ser	Glu	Leu	Pro	Thr	Pro	Leu	His	Ile	Ser	Glu			
		515				520					525						
Asp	Ser	Ser	Ser	Pro	Glu	Arg	Thr	Val	Pro	Gln	Asp	Ser	Ser	Val	Ile		
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 Val Ser Glu Ser Ser Cys Val Glu Glu Lys Pro Gln Glu Val Gln Thr  
 565 570 575  
 Ser Arg Asn Val Glu Asn Ile Asn Val Glu Asn Pro Asp Phe Lys Ala  
 580 585 590  
 Val Gly Ser Ser Thr Ala Asp Lys Asn Glu Arg Thr Ser Val Ala Glu  
 595 600 605  
 Thr Val Arg Lys Cys Trp Pro Asn Arg Leu Ala Lys Glu Gln Ile Ser  
 610 615 620  
 Lys Arg Leu Glu Gly Asn Gln Tyr Leu Phe Val Pro Pro Asn Arg Tyr  
 625 630 635 640  
 Ile Phe His Gly Ala Glu Val Tyr Ser Asp Ser Glu Asp Asp Val Leu  
 645 650 655  
 Ser Ser Ser Ser Cys Gly Ser Asn Ser Asp Ser Gly Thr Cys Gln Ser  
 660 665 670  
 Pro Ser Leu Glu Glu Pro Leu Glu Asp Glu Ser Glu Ile Glu Glu Phe  
 675 680 685  
 Tyr Asn Gly Leu Glu Asp Asp Thr Glu Arg Pro Glu Cys Ala Gly Gly  
 690 695 700  
 Ser Gly Phe Gly Ala Asp Gly Gly Asp Gln Glu Val Val Asn Glu Ala  
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gtc ccg agg gcc ccc acc ccg ttc cca tgg ccg agc cgg acc gat tca	95
Val Pro Arg Ala Pro Thr Pro Phe Pro Trp Pro Ser Arg Thr Asp Ser	
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gac tcg gac act gag gga gga gcc act ggt gga gag gca gag atg gac	143
Asp Ser Asp Thr Glu Gly Gly Ala Thr Gly Gly Glu Ala Glu Met Asp	
35 40 45	
ttc ctg agg aat tta ttc acc cag acc ctg ggc ctg ggt tcc caa aag	191
Phe Leu Arg Asn Leu Phe Thr Gln Thr Leu Gly Leu Gly Ser Gln Lys	
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gag cgt ctt cta gac gag ctg acc ctc gaa gga gtg aca cgc tac atg	239
Glu Arg Leu Leu Asp Glu Leu Thr Leu Glu Gly Val Thr Arg Tyr Met	
65 70 75	
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Gln Ser Glu Arg Cys Arg Lys Val Ile Cys Leu Val Gly Ala Gly Ile	
80 85 90 95	
tcc acg tcc gcg ggt atc cct gac ttc cgc tcc ccg tcc act ggc ctc	335
Ser Thr Ser Ala Gly Ile Pro Asp Phe Arg Ser Pro Ser Thr Gly Leu	
100 105 110	
tat gca aac ctg gag aag tac cac ctt cct tac cca gag gcc atc ttt	383
Tyr Ala Asn Leu Glu Lys Tyr His Leu Pro Tyr Pro Glu Ala Ile Phe	
115 120 125	
gag atc agc tac ttc aag aaa cat ccg gaa ccc ttc ttt gcc ctt gcc	431
Glu Ile Ser Tyr Phe Lys Lys His Pro Glu Pro Phe Phe Ala Leu Ala	
130 135 140	
aag gag ctc tat ccc ggg cag ttc aag cca acc atc tgc cac tac ttc	479
Lys Glu Leu Tyr Pro Gly Gln Phe Lys Pro Thr Ile Cys His Tyr Phe	
145 150 155	
atc cgc ctg ctg aag gag aag ggg ctg ctg ctg cgc tgc tac acg cag	527
Ile Arg Leu Leu Lys Glu Lys Gly Leu Leu Leu Arg Cys Tyr Thr Gln	
160 165 170 175	
aac ata gac acg ctg gaa cga gtg gcg ggg ctg gag ccc cag gac ctg	575
Asn Ile Asp Thr Leu Glu Arg Val Ala Gly Leu Glu Pro Gln Asp Leu	
180 185 190	
gtg gag gcc cac ggc acc ttc tac aca tca cac tgt gtc aac acc tcc	623
Val Glu Ala His Gly Thr Phe Tyr Thr Ser His Cys Val Asn Thr Ser	
195 200 205	
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Cys Arg Lys Glu Tyr Thr Met Gly Trp Met Lys Glu Lys Ile Ser Gln	
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 Ser Glu Arg Cys Arg Lys Val Ile Cys Leu Val Gly Ala Gly Ile Ser  
 85 90 95  
 Thr Ser Ala Gly Ile Pro Asp Phe Arg Ser Pro Ser Thr Gly Leu Tyr  
 100 105 110  
 Ala Asn Leu Glu Lys Tyr His Leu Pro Tyr Pro Glu Ala Ile Phe Glu  
 115 120 125  
 Ile Ser Tyr Phe Lys Lys His Pro Glu Pro Phe Phe Ala Leu Ala Lys  
 130 135 140  
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 145 150 155 160  
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 165 170 175  
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 180 185 190  
 Glu Ala His Gly Thr Phe Tyr Thr Ser His Cys Val Asn Thr Ser Cys  
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Phe Gly Gly Gly

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10

15

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